

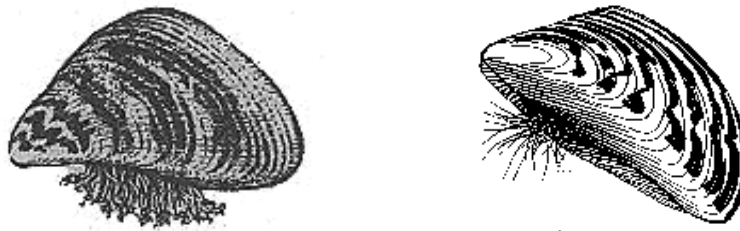
Potential Invader
Zebra Mussel: An Exotic Aquatic Species
Dreissena polymorpha



Description

- Zebra Mussels are fingernail sized freshwater mussels native to the Caspian and Black Sea.
- The D-shaped shells are yellowish-brown with alternating dark and light bands.
- Shells are usually one inch long, but can reach a length up to 2 inches.

Zebra Mussel

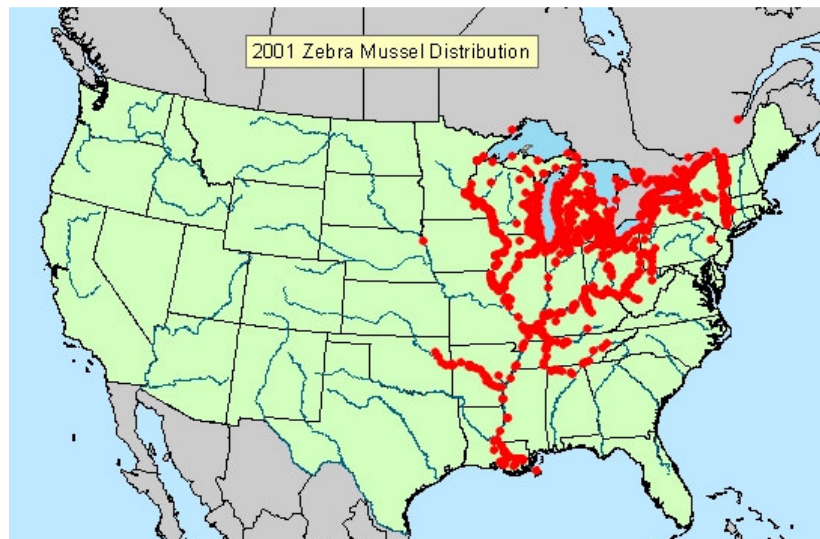


Habitat

D. polymorpha is a very hardy and persistent species that has established itself in a wide range of aquatic habitats.

- Zebra Mussels can be found through out the water body as depth, light and winter temperatures are not regulating factors.
- Zebra Mussels generally prefer quieter waters (with a flow of less than 6' per second) and are rarely found in areas with strong wave action.
- Any non-toxic surface including wood, vinyl, metal, rocks, cement and even other species (including crayfish and native clams) are suitable substrates for Zebra Mussels.
- This species has not been documented in MA but is established in bordering states (VT NY).

Distribution Map



Reproduction

Mature females release eggs which are fertilized outside the mussel and develop into free swimming larva called veligers. Veligers can drift for 3-4 weeks before settling and attaching to a suitable substrate. A gland near the Zebra Mussel's foot produces filaments called byssus threads to glue the shell to the surface. The young mussels reach maturity in twelve months and may live 3-5 years.

- Female Zebra Mussels can release over 30,000 eggs per cycle; over one million eggs per summer.
- Zebra Mussels begin to reproduce when the water temperature reaches 50°F.

Impacts and Threats Posed by Zebra Mussel

D. polymorpha is a highly competitive species that is capable of rapid growth and spread.

D. polymorpha can displace native species, reduce biodiversity, alter the food chain, ruin swim beaches, and damage equipment (including boat motors, intake pipes, diving gear, channel markers).

- Zebra Mussels can clog intake pipes causing boat engines to overheat, power plant cooling systems to fail and resulting in millions of dollars of damage each year.
- When Zebra Mussels wash up on swim beaches, their sharp shells create a hazard for visitors and their decomposition produces a foul odor.
- Zebra Mussels are highly efficient filter feeders that consume microscopic plants and animals from the base of the food chain, and their intensive filtering activity can drastically decrease the quantity of food available in the waterbody. Many juvenile fish species require a source of microscopic plant and animals to eat in order to survive and must compete with the Zebra Mussels for food. A decrease in the survival rate of juvenile fish may have an impact on the entire the fish population in future years.
- Since adult Zebra Mussels are able to filter over a liter of water each per day, in many waterbodies with infestations, the water clarity improves. Although this may sound like a positive impact, the increased water clarity allows light to penetrate deeper, thus increasing the growth of aquatic plants in the lake.
- Zebra Mussels form dense clusters, often over 700,000 per square meter. The heavy clusters can sink channel markers, destroy ship hulls and docks and cover historic underwater sites.
- Many native mussels are now threatened and in danger of becoming extinct due to infestations of Zebra Mussels. Zebra Mussels not only out-compete native mollusks for food and space, they can completely cover the entire native mussel, leading to its demise.

Management Methods

Management methods currently include mechanical methods and temperature alteration.

- Clusters of shells can be removed manually by labor intensive scraping. Although this removes the mussels from the substrate, microscopic veligers remain in the water and will recolonize the area.
- Some success has been reported with heating the water. Temperatures over 110° F are lethal to Zebra Mussels, however, this method may impact many other aquatic organisms.
- Since reproduction occurs outside of the organism, the timing for reproduction is critical. The female's release of the eggs must almost exactly coincide with the release of the male's sperm. Studies are underway on methods of disrupting the Zebra Mussel's reproductive cycle.
- Diving ducks, freshwater drum, sturgeons and carp forage on Zebra Mussels, however, there are too few of these species to have a significant impact on the Zebra Mussel population.

Other Information

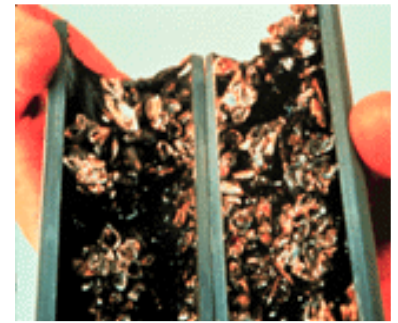
- Informational websites:
<http://nas.er.usgs.gov/queries/plants/PlantState.html> (USGS- search for exotic species by state)
www.ProtectYourWaters.net (Aquatic Nuisance Species national web site)
- On Lake Erie, power plants reported a 20-30% decline in pumping ability of the intake pipes due to Zebra Mussels.
- Zebra Mussels were first documented in 1988 in the Great Lakes region in Lake St. Clair. It is believed they were transported in the ballast water of a transatlantic vessel.



Zebra Mussels attached to a crayfish



Zebra Mussels covering a beach



Intake pipe filled with Zebra Mussels



Zebra Mussels covering an outboard motor



Native Freshwater Mollusk

Prevent The Spread!

- **Never release any plant or animal into a waterbody unless it came from that waterbody.**
- **Flush engines, dispose of bait, bilge water, bait bucket water on dry land away from shore.**
- **Report any suspected sightings of this species ASAP to michelle.robinson@state.ma.us**

References:

1) Literature References:

- Iowa DNR <http://www.state.ia.us/dnr/organiza/fwb/fish/news/exotics/zebra.htm>
 Minnesota Sea Grant <http://www.seagrant.umn.edu/exotics/zmoverview.html>
 Vermont DEC <http://www.anr.state.vt.us/dec/waterq/ans/zebra.htm>
 Minnesota DNR <http://www.dnr.state.mn.us/exotics/aquatic/zebramussel.html>

2) Photographs were obtained from:

- Sea Grant Website <http://www.sgnis.org/publicat/slide/catalog1.htm>
 (cover photo, mussels on crayfish, beach, motor and intake pipe)
 USACE Website <http://www.wes.army.mil/el/zebra/> (first line drawing)
 Minnesota DNR <http://www.dnr.state.mn.us/exotics/aquatic/zebramussel.html>
 (second drawing)

3) The distribution map was taken from:

- USGS Zebra Mussels <http://nas.er.usgs.gov/zebra.mussel/>

For more information please contact:

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Or visit the Lakes and Ponds web site at: <http://www.mass.gov/lakesandponds>

Prepared by Michelle Robinson: March 2003